

is solved for the psychrometric constants. Using the method of Least Squares

$$A_0 = \frac{\Sigma y^2 \Sigma xz - \Sigma xy \Sigma yz}{\Sigma x^2 \Sigma y^2 - (\Sigma xy)^2}$$

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BOTANY.—*New grasses from Kashmir*.¹ A. S. HITCHCOCK, Bureau of Plant Industry.

Recently there was received for identification, from Dr. E. D. Merrill, Director of the New York Botanical Garden, a package of grasses collected in Kashmir, by Walter Koelz, for the Urusvati Himalayan Research Institute, Roerich Museum, Naggar (Punjab), India. The specimens were transmitted to Dr. Merrill by Dr. R. R. Stewart, Professor of Biology in Gordon College, Rawalpindi, India. Among them were two undescribed species, one of which represents a new genus.

The new genus belongs to the tribe Chlorideae, and is allied, though not closely, to *Leptochloa* and to *Trichoneura*. The type species was collected at an altitude of 15,500 feet, which fact suggested the generic name (from one of the Greek words meaning a mountain dweller), and was found growing on sand dunes, which fact suggested the specific name.

The other species belongs to a genus of which only two species, both Asiatic, were previously known. The original, or type species, was described a few years ago by the Russian botanist Roshevitz (*Timouria saposhnikowi* Roshev.) from a specimen collected in the Tian-Shan, Turkestan. A few years later I proposed a new genus of grasses based upon a species (*Psammochloa mongolica* Hitchc.), from Mongolia. Soon after the publication of this genus I discovered that it was the same as *Timouria* of Roshevitz (his publication having been inaccessible because of the World War) but was based upon a different species.² Now a third species comes to our attention from Kashmir. The genus *Timouria* is allied to *Oryzopsis*.

Timouria aurita Hitchc., sp. nov.

Perennis, glauca; rhizomata repentia; culmi erecti, scaberuli, 60 cm. alti, nodis glabris; vaginae retrorso-scaberulae, inferioribus albidis; ligula membranacea, ciliata, 1 mm. longa; laminae erectae, involutae, scabrae, 10–30 cm. longae, 1–3 mm. latae, apice pungente; panícula angusta, pallens vel

¹ Received November 8, 1932.

² For a discussion of this subject see This JOURNAL 17: 140. 1927, and 18: 502. 1928.

purpurascens, circa 10 cm. longa, ramis appressis, inferioribus inferne nudis; spiculae brevipedicellatae, pedicellis scabris; glumae membranaceae, acutae, scaberulae, 7 mm. longae; lemma villosum, glumis paulo brevius, apice bidentato, dentibus setiformibus, 3-4 mm. longis; arista curvata, persistens, 1 cm. longa.



Fig. 1.—*Timouria aurita*. Glumes and floret $\times 5$ dia.; summit of lemma $\times 10$ dia.



Fig. 2.—*Orinus arenicola*. Upper part of panicle, natural size; spikelet $\times 5$ dia.

Perennial, with slender hard scaly rhizomes; foliage glaucous, the lower part of the plant pale or whitish; culms erect, scaberulous, about 60 cm. tall, the nodes glabrous; sheaths retrorsely scaberulous; ligule membranaceous, lacerate and ciliate, 1 mm. long or less; blades erect, scabrous, flat or mostly involute, 10 to 30 cm. long, 1 to 3 mm. wide, attenuate to a fine sharp whitish point; basal prophylli prominent, 5 to 10 cm. long, sharp-pointed; panicle narrow, pale or purplish, 10 cm. long, the branches appressed, the lower somewhat remote, naked below, these and the short pedicels scabrous; glumes nearly equal, rather broad, membranaceous, 3-nerved, acute, scaberulous, about 7 mm. long; lemma a little shorter than the glumes, densely long-villous, 3-nerved, bidentate, the teeth setiform, 3 to 4 mm. long; awn from between the teeth of the lemma, somewhat curved, not twisted, persistent, scaberulous, about 1 cm. long.

Type in U. S. National Herbarium, no. 1535770, collected in sand at Kugzil, Rupshu, Kashmir, Western Himalayas, India, alt. about 4300 meters, July 16, 1931, by Walter Koelz (no. 2328).

This species differs from the others in the setiform teeth of the lemma and in the more persistent awn.

Orinus Hitchc., gen. nov.

Spiculae pauciflorae, secus rachin continuam breviter pedicellatae; rachilla teres, glabra, supra glumas et inter flores articulata; glumae membranaceae, acutae, paulum inaequales; lemmata prominente 3-nervia, villosa, obtusiuscula, mutica, apice integro. Gramen perenne, rhizomatibus repentibus; racemi secus axem erectum adscendentes; culmi caespitiosi, erecti; laminae planae vel involutae. (*ὄρεινός*, a mountaineer.)

Spikelets few-flowered, short-pediceled in one row along one side of a continuous rachis, appressed, the rachilla disarticulating above the glumes and between the florets, the flowers perfect; glumes membranaceous, acute, slightly unequal; lemmas prominently 3-nerved, villous, awnless, the obtusish apex entire. Perennial, with creeping rhizomes; panicle of several racemes along an elongate erect axis; culms cespitose, erect; blades flat, becoming involute.

Type species, *Orinus arenicola*.

This genus differs from *Leptochloa* Sect. *Diplachne*, and from *Trichoneura*, in the entire awnless apex of the lemmas and in the villous pubescence evenly distributed over the lemma instead of confined to the nerves.

Orinus arenicola Hitchc., sp. nov.

Culmi glabri, 30–50 cm. alti; vaginae villosae vel glabrescentes; ligula 1 mm. longa; laminae 1–3 mm. latae, apice pungente; panícula 5–15 cm. longa; racemi 5–8, recti, 1–7 cm. longi; spiculae 2–3-florae; glumae 4–5 mm. longae; lemmata 3.5–4 mm. longa.

Culms cespitose, firm, erect, slender, glabrous, 30 to 50 cm. tall, from hard scaly creeping rhizomes; sheaths rather densely to sparsely villous, the lower glabrous, yellow; ligule about 1 mm. long, thin, lacerate; blades flat, becoming involute, sparsely pilose, 3 to 10 cm. long, 2 to 5 mm. wide, the apex sharp and finally hard; panicle 5 to 15 cm. long, with 5 to 8 erect or ascending racemes 1 to 7 cm. long, the lower naked at base; spikelets pale or leaden-purplish tinged, about 6 mm. long, 2 to 3-flowered, rarely 4-flowered, the rachilla slender, glabrous, the internode between the first and second floret about 1 mm. long; glumes pale, 4 to 5 mm. long, sparsely villous to nearly glabrous, acute, the first 1-nerved, the second 3-nerved; lemmas dark, often spotted, 4.5 to 5 mm. long, keeled, somewhat concave between the nerves, the obtusish tip hyaline; palea about as long as the lemma, villous; stamens 3, the anthers 3 mm. long; stigmas 2, plumose.

Type in the U. S. National Herbarium, no. 1535771, collected in bare sand, at Tsaka, Ladak, Kashmir, Western Himalayas, India, alt. 4700 meters, July 18, 1931, by Walter Koelz (no. 2365).